

WE CLAIM

1. A flush toilet comprising:

a bowl having an open upper end and a bottom discharge outlet through which waste is flushed from said bowl, said bowl having a back
5 section, a front section, and two side sections, said bowl being provided with ledges on said side sections of the bowl near the upper end thereof;

a nozzle assembly disposed in said bowl for discharging flush water along said ledges or, said nozzle assembly including two nozzles oriented so that said nozzles direct water onto said ledges in generally
10 opposite directions so that water flowing along said ledges falls off said ledges cleaning said bowl while flowing water toward said discharge outlet; and

a flush assembly including a valve for connection with a water supply, said valve being normally closed, an actuator coupled to said valve to open said valve when desired and permitting water flow to at least one of said
15 nozzles for discharge into said bowl through said at least one of said nozzles.

2. The flush toilet of Claim 1 further including a cover on said bowl arranged in front of the nozzles.

20 3. The flush toilet of Claim 1 further including an activator coupled to said valve and opening said valve when said activator is activated.

4. The flush toilet of Claim 1 further comprising two valves, one of said valves being connected to each of said nozzles.

5. The flush toilet of Claim 4 wherein water flow is generally alternately provided to said nozzles by said valves.

6. The flush toilet of Claim 5 wherein water flow provided to each of said nozzles is water flow at substantially full pressure of the water supply.

7. The flush toilet of Claim 1 wherein said valves are solenoid valves, and said flush toilet further includes a circuit board assembly electrically connected to said actuator and to said valve, said circuit board assembly providing a programmed sequence of operation of said nozzles as to when each of said nozzles are opened and closed.

8. The flush toilet of Claim 7 wherein said programmed sequence substantially alternates water being provided to each nozzle thereby allowing the full force of water flow to each of said nozzles.

9. The flush toilet of Claim 1 wherein said nozzles each include two discharge orifices, one of said discharge orifices being larger than the other of said discharge orifices.

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10. The flush toilet of Claim 9 wherein the larger of said discharge orifices are directed away from one another on said nozzles.

11. The flush toilet of Claim 9 wherein said discharge orifices are connected to one another by portions forming a slot.

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12. The flush toilet of Claim 9 wherein the larger of said discharge orifices are located outboard of the smaller of said discharge orifices.

13. A flush toilet assembly for RV's and boats comprising:

a bowl having an open upper end and a bottom discharge outlet through which waste is flushed from said bowl,

a closure member covering said outlet and being movable
5 between open and closed positions,

at least one nozzle operable to apply water under pressure across a surface of said bowl during flushing of said toilet; and

a first and second depressible buttons located on an outer surface of said toilet and to providing easy access by a person sitting on said
10 toilet, said buttons being electrically coupled to a circuit board assembly, activation of said first button initiating the flow of water from said nozzles so as to achieve flushing of the toilet, activation of said second button initiating flow of water from said nozzle to raise the level of the water in the bowl without causing flushing of said toilet.

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14. A toilet for RV's and boats as set forth in Claim 13 further comprising a water line coupled to a source of water, a pump providing water through said water line under pressure, a water valve operable to permit water flow through said water line and to said nozzle and electronically controlled
20 actuator coupled to said closure member.

15. A toilet for RV's and boats as set forth in Claim 14 wherein activation of said first button initiates opening of said water valve and water flow through said nozzle, activation of said first button also initiating movement of said closure member from said closed position to said open
5 position.

16. A toilet for RV's and boats as set forth in Claim 15 wherein activation of said second button initiates opening of said water valve and water flow through said nozzle and not movement of said closure member
10 from said closed position to said open position.

17. A toilet for RV's and boats as set forth in Claim 14 wherein activation of said second button initiates opening of said water valve and water flow through said nozzle and not movement of said closure member
15 from said closed position to said open position.

18. A flush toilet comprising:

a bowl having an upper end and a bottom discharge outlet through which waste is flushed from said bowl,

a valve mounted to said toilet for movement between open and

5 closed positions with respect to said outlet,

an actuation member connected to said valve causing movement of said valve between said positions;

an actuator operable to move said actuation member; and

a clutch associated with said actuator and said actuation

10 member, said clutch providing slip between said actuation member and said actuator when an obstacle is in a position preventing opening or closing of said valve.

19. The flush toilet of Claim 18 wherein said actuation member

15 includes a threaded member and a nut member, said nut member threadedly engaged on said threaded member and coupled to said valve so that rotation of said threaded member results in movement of said valve.

20. The flush toilet of Claim 18 wherein said clutch is a mechanical

20 clutch.

21. The flush toilet of Claim 18 wherein said clutch is an electronic clutch.

22. The flush toilet of Claim 18 wherein said clutch comprises a driving plate and a driven plate, said driving and driven plates each having complimentary formed surfaces in engagement with one another.

5 23. The flush toilet of Claim 22 wherein said surfaces include ramped castilations protruding therefrom.

24. The flush toilet of Claim 22 wherein one of said driving and driven plates is biased axially toward the other of said plates by a biasing
10 member.

25. The flush toilet of Claim 24 wherein said one of said driving and driven plates moves axially during slipping of said clutch

26. In a recreational vehicle such as a boat or an RV having a floor, a waste outlet in the floor and a flush toilet including a bowl mounted on the floor, the improvement comprising:

a valve assembly mounted to said bowl including a valve blade
5 operable for movement between an open position and a closed position with respect to a discharge opening in said bowl, said valve assembly including a downwardly extending first tubular section, said first tubular section being located in registry with said discharge opening and beneath said blade;

a base member secured to the floor, said base member having
10 a second tubular section in registry with said waste outlet and extending upwardly therefrom, said second tubular section sized to telescopingly receive a portion of said first tubular section therein; and

a slip tube located between and engaging said first and second tubular sections, said slip tube having a first end sized to telescopingly receive
15 a portion of said first tubular section, said slip tube having a second end sized to be telescopingly received in said second tubular section, whereby said slip tube operates as a vertical extension between said first and second tubular section when mounting of said toilet is such that said valve is spaced too far above said base member for said first tubular section to be received within
20 said second tubular section and whereby use of said slip tube can be omitted when mounting of said toilet is such that said valve is spaced relative to said base member enabling said first tubular section to be telescopingly received in said second tubular section.

27. The recreation vehicle of Claim 26 wherein said slip tube has top and bottom ends and annular seals at said top and bottom ends in sealing engagement with said first and second tubular sections.
- 5 28. The recreation vehicle of Claim 26 wherein said slip tube has top and bottom ends, said top end being larger in diameter than said bottom end.